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EDITED BY

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THE

INDIAN FORESTER.

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STICK MAKING.

Do any Foresters go in for making walking sticks? If so, they may be interested in the few notes sent herewith by one who has made it a hobby for years past in this country. I have spent many a pleasant hour in the forests with a saw and a small axe hunting about for sticks with a good knob and many a scratch and cut have I got in obtaining them. There are many species that suit well for walking sticks and a few for alpenstocks so the latter shall be dealt with first. Perhaps the best all round wood (leaving male bamboo out of the question) is *COTONEASTER BACILLARIS* known as *rauns* in India and *liun* or *ling* in Kashmir; it is an admirable wood and can be worked up in two or three months after cutting if simply left to dry; or it can be made ready at once by heating in a fire; in the latter case, if care be taken, it can be heated so as to leave the bark intact. The wood is close grained and takes a good polish; even the bark if well rubbed down with fine sand-paper shines as if it were varnished. As it is much sought after by natives, one has to hunt far and wide to get a long straight stick, but this adds to the interest of hunting for it. Next to *rauns* I place the *Parrotia Jacquemontiana, killar* in Chamba, *poh* in Kashmir and *posel* in Jammu. This is a strong and very elastic wood but not so stout as *rauns*; it abounds in forests at about 6,000 ft. but it is almost an impossibility to obtain a perfect and straight stick of any length, still, as long as the general direction is straight, a curve or two does not matter. I find that the only plan with this species is to cut it towards the winter and allow it to season during the cold weather with the bark on as it does not stand being dried in the fire and if the bark is taken off while green it cracks; after a month it becomes pliable and can be bent straight without fear of breaking and by the spring it is in fine tough hard condition, always retaining a certain amount of elasticity. I have also made Alpenstocks of wild pear, a good tough wood when seasoned; ash is, of course, a great wood but too heavy for my fancy; plum and even willow will do but none are equal to the two first. When seasoned they should be rubbed down with sand-paper and a good honest spike put on, not the absurd spear

head that one ordinarily sees, so sharp as to be difficult to get out of soft soil, and with a weak neck liable to break off, but a cylinder of steel with a short blunt spike not more than 2 inches long strongly welded on. It should go completely over the stick, nothing being cut away except sufficient to allow of its being fitted, a few taps with a hammer on the butt of the stick will drive it home, but on no account should a nail be driven through the tube of the spike into the wood to secure it, this merely weakens the stick ; the spike will never drop off if properly and tightly fitted at first. I have not mentioned olive wood, but in addition to the almost absolute impossibility of getting a straight stick of sufficient length for an Alpenstock, this species, probably the strongest of all, would, I should say, be far too heavy for the purpose. As regards walking sticks, many kinds of wood are suitable as long as they are put to their legitimate purpose, but if the owner so far forgets himself as to apply them for purposes of castigation to an offending Aryan brother, he will find that very few will stand the strain ! In my opinion, the olive, as found in the Salt Range, and at about 3,000 ft elevation in the Himalayas, is far and away the best species for a short stick ; it is very hard and strong and takes a beautiful polish from simply sand-papering and rubbing down with a piece of leather. The best plan is to cut the sticks in the winter and put them by with the bark on to season, by March they will be quite dry enough to be worked up and any curves can be taken out by bending while they are drying, this should done every day if possible. Next to olive, *raans* is the best wood, the sticks are very strong and the knob can be polished till it shines again by simply rubbing, after it has been sand-papered. The best knobs are those cut from roots and the sticks are better when taken up by the roots as in the case of the so-called "ground ash" in England. The wood of the root is infinitely harder than that of a branch and very often there are curious dark markings which are very effective, though in this respect nothing can come up to the dark heartwood of the olive ; but to obtain this in a knob of olive is very difficult, as a very large branch has to be cut and these seldom have straight shoots growing from them : however, they are to be had and are a prize when found Hawthorn (*ring* in Kashmir) makes a very pretty stick if the bark is kept on, the colour is a rich brown, the sticks are very light and can be got very straight with nice little knobs all the way down but it is not a very strong wood and will not bear heating when green. Parrotia (*Killar*) does not make a good walking stick somehow, at least I do not care for it. The bark is very light coloured and the sticks seem very weak. One thing in its favour is that it is easily carved and a grotesque head can be cut with little trouble ; it takes a fair polish, but is soft to work upon. The barberry (*rasount*) makes a very handsome stick, the young shoots have a very curious streaky bark ; the wood is very tough and has a bright yellow colour, so the bark

should always be left on, I usually burn the head or knob till it is quite black and when rubbed down the mixture of yellow, brown and black in the knob is very effective, especially as the wood shines well when rubbed. Wild pear makes a very good stick, it is very tough and is studded with little knobs, this looks best when burned a rich brown all over Plum is also very pretty, having a rich coloured bark but the wood is weak; apricot, peach and cherry all make very handsome sticks but are no stronger than plum. I have not yet tried sticks of *Zanthoxylon* but mean to when I find some; fakirs use it for this purpose and it looks a very curious stick with its thorny surface, but it would perhaps be difficult to get good ends. Another excellent wood of the gnarled and rugged kind is the hill "ber," it is never straight and is covered with excrescences, if taken with the root it forms a great stick and can be made up either with or without the bark; it is very tough. There is a species much prized by Kashmiris which they call "gunkash" (?) It is seldom found of any size, and is of shrubby growth, but appears to be very tough: the bark is very thin and papery so it can only be seasoned by time: heat cannot be applied as the bark cracks and blisters at once. Stick collecting possesses many charms for me, as in addition to the pleasure of wandering about the forest hunting for a "real good one" during which time I also have my eyes open for ferns, there is the making up As soon as the wood is dry enough, I start work with a small saw and cut the knob down to the proper size then to work with a large rasp and smooth down all rough parts. After that a finer rasp and finally a file to take out the marks. Then come an hour or two of hand rubbing with medium and lastly fine sand paper and the stick is ready for use. For ferrules I use old solid drawn express cartridge cases, cutting them to size and filing off the rim, they answer excellently well. As to the shape of the head or knob, that is a matter of taste, most people like a good round lump at the end as it fits well into the hand, but the crutch has its admirers; all this has to be thought of when cutting the stick in the forest and it takes a keen eye to see a good head in a branch while yet uncut, and of course this adds to the pleasure of the pursuit. And now I will cut *my* stick

J. C. McD.

WORKING PLANS.

Sir,

On reading the Review of the Madras and Bombay Annual Forest Reports for 1889-90 in the October number of the Indian Forester, I was forcibly struck with your reference to the preparation of Working Plans in the latter Presidency. As an Officer who has prepared several Plans and has now one to carry out, you will, I trust, permit me to say a few words on this interesting subject.

It is, I believe admitted by every one, that on these plans depends the future of our forests, and that framing them is about the most important of all our duties I would then, entrust their preparation only to the best and most practical officers, men who have proved themselves capable administrators, and have held charge of divisions successfully for many years. Hitherto, this all-important work has often been entrusted to the 'faltu,' the young officer recently out from home, who however intelligent he may be, lacks experience and has perhaps never held permanent charge of a division. By such procedure sure disaster is courted in the future. The best man, in my opinion, to prepare a Working Plan, is the divisional officer himself He knows or ought to know a hundred and one details about his division which would probably escape the notice of a Special Working Plans Officer who has, may be, never seen the division before, and who may have just been transferred from another province where the forests and conditions are totally different. Let, then, the divisional officer be placed on special duty to prepare the plan, another officer taking his division *pro tem* If the former be incapable of doing the work, let him be transferred and put a specially selected officer in charge, and let him draw up the plan only after he has held charge of the division for a certain period and has mastered all the details of its working Once the plan has been prepared let the framer rejoin as divisional officer. He will, one may feel assured, do his best to carry out his own proposals. On the other hand, and this is only human nature, an old experienced divisional officer resents a junior man, who is perhaps a complete stranger to the division, coming for six months laying down the law on this point and on that and tying his and future divisional officers hands for the next ten or twenty years. As soon as the new working plan comes into force, the old divisional officer feels the curb, finds his power restricted in many ways and himself reduced to a mere machine for carrying out the prescriptions of his junior. Then he begins to raise objections Prescription No. 1 cannot be done as it is perfectly impracticable; it would be much better if prescription No. 3 were altered in such and such a way; as to prescription No. 7 it arranges for working the wrong place, and so forth. In fact first passive and then active resistance is offered and in spite of control books and other ingenious devices, the plan is not carried out as the framer intended It is thus partially a failure, although in itself it may be all that is good.

Your view that "temporary simple plans for large areas so arranged as to secure the easy collection of the statistics and information regarding capabilities and growth would be best" seems a very sound one. Where is the use of preparing elaborate plans based on a minute calculation of the annual yield, when the rotation has to be fixed in an arbitrary manner. Such plans may, it is true, be framed exactly according to the prescriptions of the

Forest Code, but they should only be regarded as of academical value. To look on them as a practical solution of the problem before us will, I believe, be most injurious, for in reality their foundation is utterly unreliable. Let us then frankly acknowledge that the data we possess are, for the vast majority of our forests, insufficient to admit of the adoption of a proper rotation. Of course, in some cases, it may be feasible to draw up a permanent plan of real value, *e.g.* for sissu plantations in the Punjab, Casuarina and Eucalyptus plantations in Madras, some of the deodar and chir forests in Northern India. Otherwise, let only Preliminary Working Plans be prepared for a term of ten or twenty years at the most. Let the framer keep their preliminary nature always before him and remember that one of their most important objects is to lead up to a more permanent plan hereafter; with this idea always in view, the past history of the forest should be carefully given, together with all observations which have been made concerning the growth of the component species. These observations may, it is true, not be utilised in the preliminary plan for calculating the possibility, but they will prove of immense service hereafter when the more permanent plan comes to be made. Such a preliminary plan is, as was remarked to me the other day, not a working plan at all, in the real sense of the term, but only a plan of operations for a definite number of years. This seems exactly to represent the state of the case and such a plan if properly drawn up, will be of the greatest service, and will not be such a leap in the dark as a technically correct plan based on a rotation fixed more or less by guesswork. Such a preliminary plan for, say, ten years, can provide for plenty of work quite apart from fixing the rotation. It can organise a regular system, say, of improvement fellings, of climber cutting, clearings and girdlings; it can put fire protection on a proper footing, can prescribe the planting up of all suitable blanks, it can prescribe roads which will effectually open out the forests and it can provide for suitable accomodation for all classes of forest officers; it can divide the forest into compartments, blocks and tentative working circles, always keeping in view the revision which will take place at the end of the ten years, and making the circles elastic wherever possible. It will, of course, provide for the proper collection of statistics regarding the rates of growth of the chief species. Whatever is laid down, however, should be prescribed with a fair amount of minuteness. One of my chief difficulties with the plan I have to carry out, is that it does not particularise enough; and, in consequence, a kind of supplement to it will have to be prepared. Sweeping generalisations are all very well in reviews, being an easy form of criticism, but the officer who has to carry out a plan wants precise and definite instructions, while at the same time the plan ought to be elastic: and it seems desirable that Conservators should be permitted to carry out improvements other

than those prescribed. The framer may have overlooked some obvious improvements and new circumstances calling for unforseen works are almost certain to arise within the decennary. It would seem best, therefore, to allow them more latitude than they at present enjoy in areas under working plans.

It is to be deplored that working plans are not more widely circulated. Personally, I should like to read every plan as it comes out, whether it be good, bad or indifferent. I believe such a course would be of great service to working plans officers in particular, as they could shift the chaff from the wheat, obtaining valuable hints for their own work. The working plan for Thana, to take an instance, with its 300 odd working circles could not, I am sure, but fail to be instructive.

The Indian Forester might also give us a brief summary of these plans as they appear, together with a short critical review.

TAU THA.

MADAGASCAR TEAK AND MALABAR MAHOGANY

Can any of our readers tell us about these ? The following extract from the Report of a great sale held in October at the 'Baltic' sale rooms, chiefly of Mahogany and other cabinet woods, shews that an attempt was made to sell these woods in London but unsuccessfully.

"Madagascar teak, *ex Linda*, was duly offered as a substitute 'for East India teak, to which it was said to be similar and by 'some even better. The broker was most anxious to sell, and 'offered it at low and tempting prices, but there was no response 'and he then said he should be happy to treat for it in private— 'the Hazina wood, *ex* same ship, was put in at 6d., and with 'difficulty forced up to 11d. without reserve. Two lots of furni- 'ture wood were sold at 1d. and 1½d. respectively, and the six 'lots of Malabar mahogany, *ex Peshawur*, were passed without 'a bid"

We remember once seeing the Prospectus of a Madagascar company in which it was gravely set forth that the forests were full of "teak, mahogany, ebony and other valuable timber." The promoters presumably wished it to be thought that the teak was the same tree as the East Indian and that the mahogany was undoubtedly the proper thing.

At the same sale, we see that Padouk sold at £2-10 per ton which is only 1d. per cubic foot but that East Indian Ebony fetched 3s. per cubic foot and East India Walnut 1s. 7d. Both were shipped from Bombay. What forests did the Walnut come from? Can any one tell us ?

CULTIVATION OF TEAK IN JAVA.

The following abstract, which is taken from the Colonial Report for the year 1890, shows the area of the plantations of Djati (*Tectona Grandis, Linn. fil.*) in the different provinces of Java as well as the area of natural teak forest in each province.

The abstract further shows how many acres have been planted during the last year.

A total area of 5,098 acres was planted in the rainy season of 1888-89 (1st June 1888 to 1st June 1889). The total cost of this was £5,237 or a little more than £1 per acre. The new plantations have been surveyed and mapped All these plantations were voluntarily carried out by the natives under the superintendence of a native forest officer at a rate varying from 10s. to £1 per acre successfully stocked Last year's plantations were carried out according to the so-called Burmese method of planting, as this method has been proved to give the best results here.

K.

TABLE SHOWING TOTAL TEAK-PRODUCING AREAS IN JAVA IN 1889.

Name of Province in Java	Natural forests.	Teak Plantations.				Total.	Remarks.
		In June 1865.	From 1st July 1865 to 1st July 1880.	From 1st July 1880 to 1st July 1888	From 1st July 1888 to 1st July 1889.		
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	
Bantam	*Nil.*	*Nil.*	*Nil*	*Nil.*	*Nil.*	*Nil*	The mark + indicates that the area is not precisely known. (1) measured acres.
Preanger	31,503	218	824	748	*Nil.*	1,190	
Krawang	3,487	735	*Nil.*	489	76	1,300	
Cheribon	31,904	*Nil*	*Nil.*	459	50	509	
Tegal	11,487	1,122	1,046	1,799	200	4,167	
Pekalongan ...	4,085	1,200	1,302	1,692	446	4,640	
Semarang ...	184,751	10,284	1,185	5,464	1,245	18,178	
Japara	39,821	+	+	+	146	+	
Rembang	554,316	8,795	7,722	5,381	1,091	22,989	
Soerbaija	110,234	97	1,698	2,628	87	4.510	
Pasoeroean ...	18,837	*Nil.*	1,461	917	152	2,530	
Probolinggo ...	+	+	+	+	322	+	
Besocki	+	+	+	+	142	+	
Banjoemas ...	138	1,508	947	913	740	4,108	
Bagolen	2,294	1,525	344	1,834	807	4,510	
Kedoe	Nil.	1,023	+	156	*Nil.*	1,179	
Djokdjakarta ...	+	+	+	+	*Nil*	+	
Soerakarta ...	35,384	+	+	865	146	1,011	
Madiaen	226,584	781	1,213	957	150	3,101	
Kediri	52,342	6,880	688	2,350	116	10,034	
Total ...	1,455,000	+	+	+	5,916 (1)	+	

K.

The above paper was was received in German from our correspondent and we are indebted to Mr. C. G. Rogers for the translation and for kindly transforming the figures into English standards; a hectare has been taken equal to 2·47 acres and a florin or gulden equivalent to 1 8s.

Hon. Ed.

FOREST FLORA OF BRITISH BALUCHISTAN.

We are indebted to Mr J H Lace, F. L. S.. of the Punjab Forest Department, for a copy of the paper by himself and Mr. W. B Hemsley, F R S, of Kew, on the vegetation of British Baluchistan which was published in volume XXVIII of the Transactions of the Linnean Society From his paper we extract the following account of the vegetation of the Forests of the country, which we think will prove of interest to our readers.

FORESTS

The juniper, *Juniperus macropoda*, is the only tree which forms forests of any extent, the best of them situated some sixty miles east of Quetta, in the neighbourhood of Ziarat, and extending over more than 200 square miles of country There also remain a few square miles of juniper on the Zarghan range but in this direction a great deal has been destroyed to keep Quetta supplied with fuel for the troops and public works. The juniper usually exists in open forest Trees with clean boles are very rare, and they are generally branched from the base, the lowest branches being often burried in leaf detritus near the trunk, and their extreme ends taking an upward turn, give them the appearance of young trees surrounding the old one. The trees often take the most fantastic shapes, their branches being gnarled and twisted in every direction, and when their main shoots have been cut off many feet from the ground, which is often the case, they assume a candelabra shape

The growth of the juniper is very slow, yet it attains twenty feet in girth and occasionally seventy feet in heigh. Although it reproduces itself from seed, very few of the seedlings survive, owing chiefly to climatic conditions. The wood is light, has little strength, and burns quickly, and is employed extensively in building. principally for rafters, but it is even more extensively used for fuel The bark is of immense thickness at the base of old trees and is taken off in long pliant strips by the Pathans, who use it for roofing their huts. A kind of liquid called " Doshah " is prepared from the fruit, and the fruit is also employed in curing shins.

Pistacia mutica var. *cabulica* is common on some of the arid, stony hills and in dry watercourses, from 4,000 to 7,500 feet, for instance at Gwal Dozan in the Bolan Pass, at the base of the Chihiltán and Mashalak ranges, on the Khwája Amran, near Anambar, and in other localities. At the last named place it has grown up in the midst of large bushes or small trees of Acacia modesta, the latter affording it protection from being grazed by camels, sheep, and goats, and this may well be called the meeting point of the typical trees of the low hills of Baluchistan and the

Punjab. This Pistachio-tree never forms forests, but is usually gregarious, or scattered at intervals over the ground, the very best portions being somewhat like a very open orchard. It attains 20-25 feet in height and 6-10 feet in girt; and the short and clean bole is surmounted by a large, ample crown, the outline of which is almost semicircular in a well grown tree. The wood is very hard, dark, and finely grained, and is a most excellent fire-wood, in fact the best in the country The fruit, called "Shnee," only abundant every third year is much prized by the people. This species is easily distinguished from *P. Khinjak*, which usually occurs as a shrub in clefts of limestone rocks between 5,000 and 6 000 feet, or near Hurnai as a tree 20 feet high, much branched from the base, by its leaves and its bark. The bark of *P. Khinjak* is light grey in colour on the exterior and reddish brown inside, and is smooth and exfoliating, whereas that of *Pistacia mutica* var. *cabulica* is dark brown with longitudinal fissures. The two species are distinguished by the natives, who call *P Khinjak* "Ushgai" or "Bazgai," and *Pistacia mutica* var. *cabulica* "Gwan" (Baluchi), "Khanjak" (Peshin) "Badwan" (Hurnai). These native names are worth recording, because evidently *P Khinjak* received its name from "Khanjak," though in Boissier's 'Flora Orientalis' the description of that species corresponds to what the people call "Ushgai," and that of *P. cabulica* with the real "Khanjak"

The common olive is another small gregarious tree scattered over larger areas than the Pistachio, and usually at a lower altitude, it range being between 2,500 and 6,500 feet. It is abundant in the ravines and sheltered situations on the south sides of the Khalipat range, on the cliffs of the Wám and Mehráb rifts, and it is said that there are some very fine groves of it in the Zhob valley.

Between the Wám rift and Hurnai, at 3,500 feet, a broad, stony, usually dry watercourse is covered with a curious mixture of tree-growth, forming a fairly thick jungle. The chief element is *Dalbergia Sissoo*, which attains some size, and this is mixed with *Tecoma undulata*, *Olea*, and *Pistacia*; the principal under-woods being *Dodonæa viscosa*, *Grewia oppositifolia*, *Periploca aphylla*, *Gymnosporia montana*, *Rhamnus persicus*, *Zizyphus oxyphylla*, and *Sageretia Brandrethiana*.

In the Thal-Chotiali district, along the banks of the Narechi river and in the Pujjha valley, *Populus euphratica* forms a fringe, with a belt of *Tamarix articulata* on each side, forming forest in places.

A CONVENIENT FORMULA FOR SURVEYORS.

It is desirable, when a closed traverse is made with a compass, to test the accuracy of the bearings taken, by what is known among Surveyors as "putting up" This is simply an application of Euclid I. 32, Cor 1, which proves that all the interior angles of any rectilineal figure, together with four right angles, are equal to twice as many right angles as the figure has sides. To be able to apply this test, one must first find out the interior angles from the bearings.

Also when a survey has been plotted, it can be very easily checked with only a rectangalar protractor, if the interior angles are known.

The interior angles can be worked out geometrically, but the process is rather puzzling, and when a large number of them are required, becomes extremely tedious. Hence the utility of a general formula by means of which the angles can be worked out *seriatim* almost mechanically, and with a little practice, even mentally.

As I have not seen such a formula in any of the well known books on Surveying, I give one below, trusting it will be useful to those, who, like myself, have often to do survey works in the forest.

FORMULA.—From the bearing of the second line subtract that of the first. If the difference is between 180 degrees, and —180 degrees, add 180 degrees to it; if it is less than—180 degree, add 540 degrees; but if greater than 180 degrees subtract 180 degrees from it.

It will be observed that the angle thus obtained will be the angle towards the left of the surveyor. As it is the rule in traverses to go round the area to be surveyed anti-clockwise, this left hand angle is almost always the interior angle required. Should, however, a survey be made with the area to the right, the only alteration necessary in the rule would be "From the bearing of the *first* line subtract that of the *second*." The rest will hold good in both cases.

DEHRA DUN
Sept. 22nd, 1891.

UPENDRANATH KANJI LAL.

DR. SCHLICH'S MANUAL.

DEAR MR. EDITOR,

Some time ago I wrote some criticisms on Dr. Schlich's Manual of Forestry (Vol XVI No. 8 p 304). Since then I have had the pleasure, during a short trip home, of meeting Mr. Fisher who is Dr. Schlich's Assistant at Cooper's Hill. In continuation

of a conversation we then had on the subject of those criticisms, Mr. Fisher, no doubt echoing Dr Schlich's views, writes " Forestry ' taught at Coopers Hill must be chiefly the general principles of ' European Forestry which we can illustrate by examples in our ' own Forests and those of France and Germany. Indian ' Physical Geography, Botany and the distribution of trees is ' carefully taught at Coopers Hill and in the third year we are ' to have a course of Indian Sylviculture."

My point was that the Manual being understood to be the text book for the students in the Indian Forest Class becomes a weapon to be used against me by those whose duty it is to protect the interests of the ryot " and whose narrow view of this duty leads them to attack me when any salutary (from a forest point of view) regulation inconveniences a few ryots in the immediate neighbourhood of the Reserve where such regulation is enforced.

I have taken the liberty of sending you an extract from Mr. Fisher's private letter (which I trust he will forgive) in order that I may quote it when next I have to defend myself, but it would be far more satisfactory if Dr. Schlich or Mr. Fisher would write, I will not call it a defence, but rather a reply to my strictures.'

GHATI.

RIGHTS AND PRIVILEGES.

SIR,

I was glad to see a paper in the August number on the subject of Rights and Privileges; it is time that the whole matter was taken up and thoroughly understood both by Forest Officers and more especially by civilians deputed to act as Forest Settlement Officers, for the vaguest and most erroneous ideas prevail at present. I was associated with a civilian Forest Settlement Officer in one place and his method of ascertaining the claims of the surrounding population in the forests we were dealing with, was to suggest all the *rights* (as he called them) he could think of. Now, in this particular case, the people had, as far as I can remember, no legal right of any kind in the forests; the land had been leased to them for cultivation and this carried with it certain privileges of grazing, dry wood, fuel, &c., but the Forest Settlement Officer treated these all as rights and they were entered as such. Nor did he stop at those they asked for of themselves, but went on to say, for instance : " but are you sure you do not want anything more, such as stone for building, &c." ; of course, at every fresh suggestion, the villagers said " Yes, we

want that" and straightway it went into the record. It struck me then that this was beginning at the wrong end and I protested that if they were entitled to any privileges they must prove that they had been given them originally with the land and had used them regularly ever since, but I was overruled. In another case, so little was the word "right" understood, that a civilian Forest Settlement Officer and a Forest Officer recorded a *right* and then stultified it by adding "during the pleasure of Government," which, of course, to all intents and purposes, converted it into a privilege; but the unfortunate use of the first word has since given rise to great trouble with the villagers who cannot be brought to see that they have no legal right

In the Shahpur Salt Range Rukhs, which are about to be settled under the Act, there are several curious and destructive so-called *rights* to be dealt with; thus, villagers have the "right" of grazing in any of the Rukhs in the Khushab Tahsil and also of collecting dry wood, but here also certain words in the old record show that these are not rights but merely privileges. Now the evil of such wholesale privileges is shown in a case which occurred there: the villagers living near a Rukh came to the Forest Officer and asked him to close the Rukh to grazing altogether and they would buy the grass for the same amount as the grazing lease brought in. This was such an eminently desirable arrangement that the Forest Officer jumped at it; but the Forest Ranger, a man of great experience, pointed out that this could not possibly be done unless every villager in every village agreed. Even if 99 out of 100 concurred, no one could stop the hundredth man (not Stockton's!) from bringing all his cattle to graze in the closed area. It is to be hoped that in the ensuing Settlement, the Settlement Officer will confine himself to claims to easements, and that such privileges will not be given by Government, for they are an utter bar to forest work That they should be called *rights* and notified as such by any Government, only shows how vague was the meaning attached to the word when the first settlement was made. Forest Officers must keep their eyes open in future and thoroughly understand what a *right* is and not allow any claim to be recorded as such unless it can be proved to be an easement and upheld in a court of law.

It is curious that the Madras Government, which foolish Punjabis style "benighted," should be the one to lead the way in dealing properly with this question; but it is a fact, and their example must be followed; sentiment, which has done so much harm in the past, must be avoided in what are intended only to be legal enquiries or we shall find much of our valuable forest property hampered with vexatious easements over it, which a little care and knowledge at the outset, would have enabled us to steer clear of Let Forest Officers when working with Forest Settlement Officers at a Settlement, carefully scrutinize every claim and if it cannot be proved legally, object

at once; if overruled they have the right of appeal under the Act. It will be found that out of a thousand so-called claims to rights not one is more than the merest concession which is no real right but dependant entirely on the favour of the Government and alterable by it whenever necessary in the interest of the forests or the people.

Not long ago, while visiting for the first time one of the forests in Kashmir, I came across what seems to me a real legal right and one that would hold good in any Court of law; in the Drogmula Ilak is a famous bubbling spring, situated in the very heart of a forest known as Bubur Nág (note the resemblance between English and Vernacular, *bubur* means bubbling). Here long years since, a fakir came and settled down obtaining from the Sikh Government, who then ruled over Kashmir, a sanad, and this has been repeated by the successive Sikh Governors, to his representatives, long after the fakir had passed away. Of course, as the fakir could not marry, the right should have died with him: but the bubbling spring was too valuable to lose, so he brought in his relations, and, as usual, instead of a solitary holy man, there is now a little village in the very heart of the forest which should never have been allowed to grow up Now here is a right which apparently cannot be interfered with, as having been given in writing by a former Government; though even here the details could be fought if it were worth while, for the original sanad merely gave a right to the growing of a certain weight of rice in the land of the nearest village and no mention is made of power to build three large houses and a masjid at the Bubur Nág. But peace to his ashes; the old fakir of a century ago had an eye for the beautiful and has surrounded the spring with magnificent walnut trees and built a nice stone vault for the water to bubble in and he himself lies within a few feet of the spring he cared for so well. As yet, little harm has been done to the forest, for beyond a few small patches of garden there is no cultivation. Altogether, a more placidly beautiful spot can seldom be seen and the beauty of the place is enhanced by the suddenness with which one emerges from the gloom of the surrounding forest to the quiet little clearing made so long ago, when there were no obnoxious Forest Officers with questions of rights and privileges to disturb its calm!

In another case we made mistakes and that was in the leased forests of Chamba. In 1871 a Working Plan of Kalatope Forest was made and an elaborate Record of Rights drawn up which has been strictly followed to the present time, and it has been most useful; it is perhaps the first good record drawn up in the Panjab. But all the same we really were not justified in giving *rights* to villagers over forest land which is the property of the Raja and this has since been recognized; in the Pangi forests, privileges only have been granted. Another mistake that has frequently been made, and that as lately

as 1881 in Chamba, and before that in Jhelum, is the wording of the grazing "rights." In most cases the villagers are allowed to graze "their cattle" in the forest, no number being specified and no distinction of kinds. One particularly bad example is to be found in a Reserved forest (sec. 19), in the Jhelum District, where it is open to the villagers, under the wording of the record, to bring in ten thousand camels if they own them. Cattle must be counted at the time the privilege is given; where no limit is prescribed, villagers will go on breeding to the utmost capacity of the grazing ground for fodder, with the inevitable result that the pasture will be insufficient in a short time and pressure will be brought to open a further portion of the forest to grazing "the present area being totally insufficient for the wants of the villagers" This is actually the case in the Salt Range Rukhs of the Khushal Tahsil When the present Settlement was made, large areas of shamilat were given to villagers, quite sufficient for the existing cattle, breeding went on, then further 'rights" were given in the neighbouring Rukhs, still there was no restriction on breeding, and the consequence now is that the villagers complain they have not enough grazing ground and strong endeavours will be made at the forthcoming Settlement to get further portions of the Rukhs opened to grazing. It to be hoped, as is mentioned in the article, that it will be recognized that the Forest Settlement Officer is not a judge of equity but one of civil law, otherwise it will hardly be worth while creating any Reserved forest in these tracts.

Forest Officers should copy out the last para. of the Article, have it framed and place it in front of them on their writing table to be read, marked, learned and inwardly digested, so as to avoid such errors as have been committed in the past.

I. C. Mc. D.

Our correspondent 'Civilian' had evidently done what we fear is usually the cause of the mistakes—mixed up the 'Rights' of the Forest Act with the 'Rights' of the 'Record of Rights' in the village *Wajib-ul-urz*.' Of course the two are utterly different things and the Forest Act word ought really to be 'Easement.'

HON. ED.

A "BLAZER."

SIR,

Down here on the Bombay side we have been discussing a "blazer" for the last 6 months, and I have prepared a lot of designs; a few of the best are enclosed. None of them are satisfactory as regards the purity of the greens, but they would look vastly different if done in good dyes on flannel. One or two men down here would like plain greens, but as you say, the sun is fatal to most greens and a green coat almost takes the cake for a maximum of shabbiness in a minimum of time. For this reason (if no other) I have employed about 4 different greens, so that even if they *all* fade, there will be no broad masses of faded and unfaded color, since each stripe will fade to a different tone, and so preserve a much more respectable appearance. Secondly, I object to bicycle-club *badges* and think uniform colors more suitable for soldiers and police than for gymkhana purposes. I think green, little as I like it, is imperative on us, at least as a ground color, and prefer "sage" to "rifle" green, though both can be used with good effect. If there must be a "device," I beg to suggest a simple *tree*, as I have before suggested it in place of the literary puzzles B.F.D.; S.F.; F D.; KFD.; A.F., &c. &c., which ornament our guards caps and suggests nothing. Any one of artistic taste could easily design a tree which could be equally well embroidered in silk or cast in brass and there would be no mistaking its meaning. The difficulty will be to get *fastness* of color combined with purity of shade, and taste in the combination. If anybody knows a firm of flannel printers, we might get samples of all green dyes, and information as to qualities of each. We could then cut strips and join them to taste.

VELLEDA.

Note.—We regret that we cannot afford to publish a plate showing the designs for 'harmonies in green' sent us by our correspondent. We keep them, however, and shall be happy to shew them to any one who is interested in the subject.

HON. ED.

III.—OFFICIAL PAPERS AND REVIEWS.

VANILLA IN MERGUI.

The Burma Gazette of October 3rd 1891 has an account of the work done in 1890-91 in the experimental plantation at Mergui, which after giving the results of the years' work in the growth of coffee, cocoa and tea finishes up with a 'Memorandum on the curing of Vanilla' by Mr. C. Ingram, Sub-Assistant Conservator of Forests, South Tenasserim Division, which we have read with much interest, and reprodnce, as it may be useful to Forest Officers in other places which, like the Divisions on the Malabar coast, are capable of growing that most valuable plant.

Coffee seems to do well, but to suffer like the bushes in Ceylon and on the Nilgiris from the ravages of *Hemileia vastatrix*. Apparently, all the plants are of the Liberian species, and we agree with Mr. Ingram that a plantation of 2 acres is not large enough to settle the question of whether or not coffee will pay in Mergui. Pepper, we see, is also cultivated and we are glad to remark that the cultivation is extending, which is a good thing, as we believe pepper to be an exceedingly paying crop and one which has been somewhat neglected. It is not much use inciting people to make tea and coffee estates in Mergui, considering that both products are suffering from over production, but the cases of cocoa and pepper and vanilla are different, while we hope that if such a useful and interesting experimental garden is kept up and extended, some attention will be paid to gamboge and gutta-pecha, both of which are Forest trees and worthy of the best attention of the Department.

MEMORANDUM ON THE CURING OF THE VANILLA OF THE MERGUI GARDEN, AUGUST 1890-JANUARY 1891.

I.—The different methods of curing Vanilla in vogue.

Descriptions were compiled of the methods of curing vanilla as followed in Mexico, Guiana, Peru, and the Island of Reunion, and it was necessary to select one of them to be followed.

I.—In *Mexico* the pods are collected and placed in heaps in the shade from sun and rain, and left for a few days. (This is necessary, as I found that if the pods were plucked and put in the sun at once they always split down the sutures). Then—

(*a*) If the weather is warm and clear, they are spread out on a wollen blanket and exposed to the direct rays of the sun. At midday the blanket is folded round the pods and the bundle is left in the sun for the remainder of the day. In the evening it is enclosed

in a light wooden box to "sweat" all night. Next day the same treatment is followed and the pods, after exposure to the sun, acquire a dark coffee-colour,—the shade deeper in proportion to the sweating process.

(*b*) If the weather is cloudy and rainy, the vanilla is collected into bundles, a number of which is packed into a small bale. This is first wrapped with a woollen cloth, then with banana leaves, and finally with stout matting, which is firmly bound and sprinkled with water; an oven is then heated to 140°F (60°C.) and the bales containing the larger beans are put into it. When the temperature has fallen to 113°F. (45°C.) the smaller beans are introduced and the oven is tightly closed. Twenty-four hours afterwards the smaller beans are taken out and 12 hours later the larger ones. The vanilla has then acquired a fine maroon colour.

The drying operation then commences. The beans are spread on matting and exposed to the sun for nearly two months. When the drying is nearly complete it is finished in the shade, and the beans are tied up into small bundles for sale.

II.—In *Guiana* the pods are placed in hot ashes till they begin to shrivel, then wiped and rubbed with salad oil, tied up at their lower ends, and hung up to dry in the open air.

III.—In *Peru* the pods are first dipped in boiling water, then tied up at their ends and hung up in the open air. After 20 days the pods are rubbed with castor oil and a few days later are pressed into bundles.

IV.—In the Island of *Réunion* the ripe fruit are sorted according to length and scalded. The long ones are dipped into water 194°F. (9°C.) for ten seconds, the medium ones for one minute or longer. They are then exposed to the sun between woollen blankets until they acquire a maroon colour, which happens in about six or eight days. The pods are then spread on hurdles and placed in garrets to dry gradually; when the pods are sufficiently dry to allow them to be twisted round the fingers the process called "smoothing" commences. This requires great care as every bean must be passed through the fingers from time to time so as to spread the oil which exudes on the whole length of the bean as the fermentation proceeds. On this treatment the lustre and suppleness of the vanilla depend. The beans are also turned frequently to ensure their drying equally on both sides. In a month the pods are dry and are then sorted out according to their lengths—

(1) *Fine vanilla*, from 8 inches to 11 inches long, glossy dark-brown and unctuous. Some covered with fine frost like crystals known as *giore*.

(2) *Woody vanilla*, from 6 inches to 8 inches long,

lighter in colour, not glossy, presenting grey spots on the surface, and having very little *gloire*.

(3) *Vanilla*, consisting of two varieties, both short—

(i) obtained from ripe fruit and covered with white crystalline efflorescence;

(ii) obtained from unripe fruit and owe their colour to contact with those of better quality.

Of the four methods described above, I determined to select that followed in Mexico, the vanilla from Mexico being considered the best in the market.

2 —*Heating oven used.*

In the Mexican method of curing, it will be seen that there are two processes: one for fine weather and one for cloudy and and rainy weather. The first pods were plucked on the 27th August, when the weather was very showery. This entailed my devising an oven which would retain heat for about 48 hours. I made one of well-wrought clayey earth which, as it is interesting, I describe. The apparatus consisted of an oven with a furnace below

The furnace measured 3 feet by 2 feet (outside) with walls 6 inches thick and 12 inches high. Opposite the opening of the furnace a round hole was made in the wall, and a bamboo, open at both ends, was inserted as a chimney (figure 1). On the top of the furnace an iron grating was placed (Figures 3 and 4—*k*, *k*). On this mud to a height of 4 inches was plastered. This formed the foundation to the heating oven. An ordinary kerosine-oil box with its top and bottom sides knocked out was placed on this foundation, and mud was plastered to a thickness of 4 inches all round the four sides of the box (Figure 2, *a*, *b*, and Figures 3 and 4, *d d* and *e e*). On the top of the oven another iron grating was placed, on which mud was plastered to a height of 4 inches also. The length of this last mud plaster was the total length of the oven, while the width was the width of the wooden box only. This formed the cover of the box and was moveable. When the oven was heated up to the required heat, plaster was laid on at *c c* (Figure 3), this made the oven air tight. The object of having the walls of the oven 4 inches thick always was to retain the heat inside for a long time. At the bottom of the oven three pieces of bent hoop-iron were placed as a support for the vanilla and in order to keep it as much as possible in the centre away from the hot bottom,

When this apparatus was finished it took 36 hours to dry with a strong fire in the furnace; and when once dry it always took six hours to get the heat in the oven up to 140°F. But it retained the heat admirably, being warm even after 36 hours from the time of plastering the cover air-tight. Although it answered its purpose (the heating of only a couple of hundred pods) admirably, it was at the best a very temporary and *katcha* affair. Where a large

amount of pods required sweating the apparatus would of course be of brick or any other *pucca* material; and a swinging door on one side for the oven would be perferable to having a moveable lid, as it would then be possible to have a fire on the top of the oven as well, equalizing the temperature over all parts of the oven

3.—*The process of curing.*

One hundred and thirty-five pods were plucked on the 28th August and put in the shade. They were sorted into two sizes, large and small. Each size was made up into a bundle as follows:—

> Pods first wrapped in thick woollen cloth to a thickness of 2½ inches all over, then wrapped in plaintain leaves and then in stout palmyra leaf-matting 6-fold, the whole tied tightly with cane and sprinkled with water. The oven being previously heated to the required temperature, the bundles were put into it and the cover plastered so as to make it air-tight. The vanilla bundles were put in on the morning of the 30th the bundles of smaller pods taken out on the morning of the 31st, and the large ones in the evening.

The process was a decided success as the pods were of a fine maroon colour and smelt very strongly of vanilla. One hundred and eighteen pods were subsequently treated in the same way with a like success. The great difficulty now was to dry them. The first few days after the heating process the weather though showery was now and then clear, and the pods obtained a sunning for about an hour daily. This, if it did nothing else, prevented the formation of mildew on them. But from the 6th September to the beginning of October the weather was peristently rainy; and although I did my best to keep the pods dry by placing them over a dry charcoal fire, I was not able to prevent the formation of mildew on them. The immediate effect of the mildew was to give the pods the peculiar rancid smell of rotting succulent vegetables, the flavour was lost, and subsequently, when the weather changed and there were clear days, the mildewed parts on being sunned became quickly dry, hard, and brittle, and the pod instead of becoming gradually of a glossy, coffee colour, became of a dry, brown one, and was almost scentless. If mildew can be prevented from forming, I have no hesitation in saying that the curing of the vanilla next year will be a decided success. But this is a difficulty not easily overcome: the pods ripen in August-September and the curing must of necessity take place when the rains are heaviest and when the air is saturated with moisture. In order to obviate this as much as possible, it will be advisable to defer the plucking and make it as late as possible, great care being taken to prevent the pods from cracking while drying.

FOREST REPORTS OF 1890-91.

The Calcutta Gazette of September 2nd contains the Review of the Bengal Forest Report for 1890-91 by the Lieutenant-Governor, and the Punjab Gazette of September 3rd similarly gives that for that Province. We presume that we shall have to review the Reports themselves some six months hence, meantime we may notice some interesting points in these Reviews.

In Bengal the reversion to the system of small Divisions which was certainly in force in 1882, instead of the cumbersome one of large Divisions and Sub-Divisions, which always entails double correspondence and double account work, is spoken of as a 'most important administrative reform' and it is said that the services of the Divisional Officers are now made available for duties in which the paucity of officers was keenly felt. Does this mean that before Mr Dansey took charge, the functions of a Divisional Officer were only those of general supervision and Office routine?

We are glad to see that the question of the Sonthal Forests has again, comet like, come round Its last appearance was in 1882, so that it is clear that its periodical cycle is one of about 10 years. This time we hope the wanderers will be tamed for good.

Mr Dansey makes a serious indictment against the Bengali Babu as a Forest Officer, upon which the Lieutenant-Governor says:—"If the natives of Bengal cannot show themselves fit for 'the work required, it will be incumbent on Government to seek 'for better material elsewhere, but it is hoped that a greater en- 'couragement of athletic exercises as a part of school education, 'may help to train a generation which will not be liable to this 'reproach. In any case, Sir Charles Elliot has no wish to make a 'sudden change and will watch the working of the present system."

At the same time we believe we are right in saying that the Assam authorities usually succeed in getting some good men; and that it is not uncommon for Bengalis to apply for work in the North-West and Central Provinces.

The remarks of Sir Charles Elliott on grazing are worth quoting, and especially so as we believe his view that in the selection of Reserved Forests provision should be made for special grazing grounds so as to relieve the timber-supplying area from the incubus of grazing privileges, is quite sound and is really in full accord with the recently declared policy of the Government of India.

Grazing.

"The Conservator expresses an opinion that grazing is not 'less injurious than fires to a deteriorated Indian 'timber forest. The Lieutanant-Governor 'agrees in this view; but the Conservator appear to be also of 'opinion that grazing is, as a rule, only permitted for the purpose 'of increasing the Government revenues. The Lieutenant-Gover- 'nor believes that the object will usually be found to have been not 'the increase of revenue, but a desire not to be hard upon the

'people, who grieviously resent any restriction of their grazing 'rights. He has lately insisted, in the case of the Angul forests, 'on adequate grazing grounds being reserved for the cattle of the 'villagers, so that there may be no necessity for a modified 'admission of grazing rights within the forest area and no risk of 'injury to the growth of forest produce."

We note with interest that a Working Plan is to be made for the Sundarbans Forests so as to concentrate fellings and work by rotation, and that the Lieutenant-Governor impresses on the Conservator the hope that "in his zeal for the improvement of 'Forest Administration he will not forget the necessity of contrib-'uting to the general revenue of the Province." This means, we hope, the better utilization of the Sal forests of Chota Nagpore.

There is not much for us to note now in the Punjab Review, except the views of Sir James Lyall on the subject of Forest Fires. The review says:—'Forest fires, which were last year so disas-'trous, have this year been few and unimportant. This was to be 'expected, as, for some years after fires, the forests are less inflam-'mable and the punishments inflicted have at least a temporary 'effect, but in any case the character of the rainfall would have 'prevented extensive fire. There can be little doubt that in most 'cases these fires are intentional, but are not in one sense 'malicious. They are merely an obstinate persistence in an old 'practice intended to provide a fresh grass supply for cattle. In a 'correspondence with the Conservator, the Lieutenant-Governor 'expressed the opinion that in certain tracts fire-lines round the 'reserves and the periodical firing under regulation of forest lands 'outside were measures which should be tried. If the evil cannot 'be remedied in this way, it will be necessary to be patient with 'the people, and to be content if they are gradually induced to 'amend their ways. Arbitrary laws and severe and indiscriminate 'punishment would exasperate and alienate the population."

This, at any rate, is important as definitely according sympathy with fire protection, and we agree that in fire protection work it is better to try and carry the people with you than to trust to pains and penalties. The man who has once gone to jail for firing a forest is just the one to revenge himself by incendiarism the next year, and when a ryot determines to burn a forest it is the easiest thing possible to do it without being caught, provided he does not tell his fellow villagers of his intention. What has to be done is to try and make the people understand the fallacy of the notion that pasture is improved by burning. Doubtless a temporary crop of forest shoots is got from those coarse grasses which can stand fire and like it, but the usual effect is to encourage them at the expense of the finer and better kinds which have not the same strong clumps and the same depth of root. There are, we believe, places in India where the two can easily be seen side by side and the best proof is the constant demand of

villagers to be allowed into fire protected reserves after they have burnt those not protected and cleared off the resulting crop of shoots. To teach these principles, however, the Revenue Department must co-operate and we believe that if the people of the Punjab and specially of the Hills, once realize that the Government, whether in the Forest Department or not, is in earnest in its desire for fire conservancy, they will assist and co-operate in the work.

There is not much of note in the Review of the Assam Report (which itself has not yet reached us) by the Local Government as given in the Assam Gazette of October 3rd, but we see that "the 'aversion of ryots to growing valuable trees on lands formerly 'jhumed" has been overcome which means, we suppose, that Assam is about to start what we understand better as 'toungya' plantations?

The views of the Chief Commissioner about the policy of finance against the policy of improvement are worth quoting, as they seem to us to be rather inconsistent with the opinions on the same subject held by the Government of India and the Government of Madras and Bombay "The Chief Commissioner is not in a posi-'tion to say how far the extra expenditure incurred during the 'year was justified by the circumstances which existed, but Mr. 'Ward observes that an increase took place under every head 'except "Communications and Buildings" and "Contingencies," 'and he would repeat the hope which he has expressed on previous 'occasions that the Conservator will watch jealously over all 'increases of expenditure, with a view not only to secure a surplus 'but also to render that surplus as large as is possible and consis-'tent with a proper fulfilment of the administrative necessities of 'the department."

We have never been in Assam, but we always thought that what the Assam Forests most wanted was the improvement of communications and the construction of proper buildings to help to ward off some of the sickness which Forest officers of all grades appear there to suffer from The surplus revenue in 1890-91 was less than half a lakh, the usual result being about a lakh, and this decrease is apparently what has brought down the Chief Commissioner's displeasure.

TESTING OF AGRICULTURAL IMPLEMENTS.

We have received a list of Agricultural Implements and Machines which have been tested in India from 1st April 1889 to the 30th September 1890. As this list is published by the Government of India Central Printing Office, we presume it can be bought there. Details are given as to the price, where procurable, opinions of the official reporters, and whether the machine or

implement is used to any extent by native agriculturists. Thus we find information about ploughs, winnowing and cleaning machines, waterlifts, chain pumps, corn crushers, sugar mills, hoes, harrows, grubbers, &c. Many of these implements are in use on Government farms, where, under skilled supervision, they do good work and are favourably reported on, and in some cases they are slowly spreading among native agriculturists. Where the latter find an increased outturn for the same amount of labour, as in the case of the new iron sugar mills, they are ready enough to adopt even what is a more expensive machine, and we must look to Agricultural shows for gradual and more extended adoption of the improved article.

REVIEW OF PARTS I AND II OF A MANUAL OF FORESTRY,

BY

DR WILLIAM SCHLICH.

Translated from the "Forst und Jagd Zeitung" for the Indian Forester by "S. E-W."

An English Manual of Forestry! This is a subject for both surprise and congratulation, for up to the present, forestry has attracted hardly any attention in the United Kingdom, and the Indian Forest Department, to which the first officials were appointed in 1847, is responsible for the attention now directed to this science. The importance of this publication is evident when we remember that almost one third of the population of Europe is able to utilize the English language. The Author, Dr. W. Schlich, a Native of Hesse, was commissioned after twenty years of forest service in India, to write this Manual and took up the work after careful inspection of many forests in vario countries. The book is to be arranged in the following order.

Part I. The Utility of Forests.
Part II. The fundamental principles of Sylviculture.
Part III. Creation, Regeneration and Tending of Woods.
Part IV. Forest Protection.
Part V. Forest Utilization.
Part VI. Forest Working Plans.
Part VII. Forest Finance.

The first volume now published, contains Parts I and II.

The Author who has been since 1885 Principal Professor of Forestry at the Royal Indian Engineering College at Coopers Hill, and was formerly Inspector General of Forests to the Government of India, is to be heartily congratulated in having compiled this volume in the clearest and most concise manner, without any unnecessary additions That this was a most difficult task is evident when we consider the ignorance of forestry which obtains amongst all English speaking races · and all honor is due to the author for having so successfully overcome the difficulties encountered In the excellent Introduction which opens the book, the author touches on the reasons for the study and practice of Forestry, and gives a list of technical terms, some of these being merely translations from the German that have been adopted in England

The first part of this volume deals with the utility of Forests as noted above, and this subject is divided into Direct and Indirect utility The importance of Forests to the state is explained to the English reader in a very clear manner The laws regulating increments of growth and the return to be expected from capital invested in Forests are presented in Weise's tables adapted to English circumstances, and Dr. Schlich recommends from the data there given, that all land which would not yield 2½ per cent from other treatment should be planted with Scotch Pine or other suitable species The employment of labor in forestry is explained by well known examples from German statistics

Pages 25-56 are devoted to the indirect utility of forests chiefly in regard to their influence on the temperature of soil and air, on evaporation, on precipitation of moisture, and to the mechanical protection and hygienic effects of tree growth.

To any one acquainted with German works on these subjects, there is nothing new to be found here, in fact the author refers repeatedly to Dr. Lorey's "Handbuch der Forstwissenschaft" and he takes up a position in reference to the effects of forests which shows that he is not to be misled by any exaggerated ideas on the subject. He denies that any general rule can be laid down for regulating what percentage of the area of a country should be covered with forests and concludes with a short sketch on the ownership of forest land

The appendices to Part I are exceedingly valuable These consist of remarks on "Forestry in Great Britain and Ireland" (page 57-67) and on "Forestry in India" (pages 68-96) The author shows that England with its 4 per cent of forest is sufficiently wooded on account of its insular position and climate and that although creation of forests is advisable in some mountainous districts, yet that as forests in these localities would never pay, it would be cheaper to supply the mechanical effect wished for by suitable engineering works.

As protection against storms and sea breezes on the west coast of the United Kingdom, the author recommends the planting of belts and blocks of suitable trees. Regarding forest produce, it is apparent that in many parts of England and Ireland wood fuel is not to be purchased, and that the greater portion of the timber used, as Teak, Mahogany, etc., cannot be produced in the country. In the five years 1883-1888 the imports of Forest Produce amounted to £8,000,000 and those of timber to about £15,000,000 sterling, giving a total of £23,000,000, whilst even if the matter had special attention it would not be possible to produce more than £1,000,000 worth of Minor Forest Produce and £12,000,000 worth of timber in the whole country; to raise the latter quantity an area of 6,000,000 acres would be required, whereas the whole area of the United Kingdom amounts only to 776,000,000 acres, of which 268,000,000 acres consist of waste, water, roads, &c. Dr. Schlich does not doubt that it would be possible to find this 6,000 000 acres of land, and, after a consideration of the Forest Conservancy in force in these countries which furnish the largest quantity of imports to the United Kingdom, he comes to the conclusion that an extension of the woodlands there would be advantageous, but that the price of the timber is so low, and deer and game preserves command such high rents, that it cannot be expected that private landowners should invest much capital in forestry, whilst the area of Government land is so small as to be of no account in this question. In these circumstances, the much to be wished for increase of opportunities for labor for the smaller cultivators in Ireland and Scotland by the inauguration of works of forestry is not likely to be afforded for sometime.

Well worthy of attention are the details given of forest affairs in India. India has an area of 1,500,000 square miles and a population of 225 millions, or 12 and 7 times respectively more than that of the United Kingdom. In this appendix the physical configuration of the country, the climate, the distribution of Forest Produce and Forest Protection are treated of. It is evident that the conditions of forest growth must vary enormously in a country so vast that it extends from the sea to the highest mountains in the world, over 23 degrees of latitude, and where the rainfall is the heaviest known. These conditions can clearly only be roughly sketched in such a work as this and this is done by arranging the country into the following natural divisions.

I. Himalayas; II. Indus Plain; III Ganges Plain; IV Northern India; V Central India; VI The East and West Coasts; VII Burma; VIII The Islands for which temperature and rainfall tables are given. It appears that India was formerly a richly wooded country and according to the description of a Chinese traveller, neither hot nor cold. The destruction caused by wandering tribes, by British civilization and finally by the extension of Railways, have settled the fate of the forest and it is only

during the last few years that the want of wood has drawn attention to their condition. The character of the forest is governed by the nature of the rainfall, and as the rainfall diminishes, the forest growth gradually disappears. From the Tidal forests to the Alpine heights of the Himalayas, the greatest possible difference in circumstances exists, making the country indeed a paradise to the forester. Not the whole of India is under British rule but only 912 000 square miles with 202 millions inhabitants. The remaining 551,000 square miles with 53 millions of inhabitants are under British protection, and about 25 per cent of the whole area is under forest. Of the area in British territory, about one half belongs to the state and the remainder to private individuals and Government exercises practically no control over the latter. Of the 70,000,000 acres of the state forest, 55,000,000 (equal to 11 per cent of the total area of the country) are under the control of the Forest Department and of this area 33,400,000 acres are reserved, 10,100,000 acres are protected and the remainder unclassed forests. Of the total area of state forests about 55 per cent is systematically managed and the other 45 per cent only so far as the burden of rights and concessions will permit it. Dr Schlich considers the question of whether 11 per cent of the total area of the country is sufficient to set aside as forest land from the stand point of "Forests in relation to climate and rainfall, to the regulation of moisture and to the Forest Produce required by the country." The most important question in India is that of the quantity of rainfall consequent on the yearly monsoon, but the observations recorded in India, extend over too limited a period to permit of any final conclusions as to the effects of forests on the rainfall. The author however agrees that under the most favourable conditions the effects of a limited area of forest can only effect the climate and rainfall in a very slight degree. Men and cattle must be, however, more than thankful for the shade afforded by the forest in so hot a climate. Dr. Schlich is of opinion that the regulation of moisture in a tropical country like India may be influenced by forests which give off a considerable amount in evaporation. But of more importance is the effect of forests in regulating the spring level, because, of the 200,000,000 acres of cultivated land in India, 30,000,000 acres, chiefly in the Indus and Ganges valleys, are irrigated artificially, and at least one half this area directly from springs. The greatest stress is however based on the mechanical effects of forests in mountainous countries, and example is given of a peculiarly instructive case in the catchment area of the Indus. It is evident that the heavy rainfall in the tropics gives much more importance to the question of preventing the removal of the soil in India than with us but here also Dr. Schlich utters a note of warning against excessive zeal. The demand for forest produce in India is very considerable but only the sea board and its vicinity reaps the benefit of

facilities of importation Iron is dear because almost all of it must be imported from England, in the same way coal is expensive on account of the unfavorable position of the coal fields. Many railways still use wood as fuel, and the burning of cow dung for domestic purposes is still common enough In conclusion, it is considered that the 33,000,000 acres, of reserved forests should be in time increased to 50,000,000 acres even this area being less than one third of the state forests in the country; and only by doing this, the author thinks it is possible to meet the demands on the forests in India. The income from these forests shows a steady increase, the average annual net revenue between 1864-67 amounted to 2,100,000 marks and 1882-89 to 7,800,000 marks and the author considers that the yet increasing revenue to be obtained from the state forests will some day make good the anticipated loss from the Opium revenue.

The second part of this volume which treats of the "Fundamental Principles of Sylviculture" is divided into the following sections

Locality in relation to Forest vegetation.
Shape and development of Forest Trees.
Character and composition of Woods.
Sylvicultural systems

We can afford to devote less attention to this portion of the book than to the first part which contains so much of interest; for in this second part there is nothing new to be found by any one who is even only slightly acquainted with the ample literature which in Germany treats of locality, composition and creation of Forest. The author impresses on the reader that the illustrations he gives are taken from a limited area, namely that of Western Europe in the 50th degree of north latitude, but having in view the main object of Dr. Schlich's work, we must hope that the author will give, in a later volume, out of the plenitude of his experience, some account of Indian species. The chief value of Part II of this volume lies in the fact that up to the present there has been practically no English literature on the subject of Forestry; and that now a book is published which, though extremely clear, is yet eminently scientific, and places the present state of Forestry and the firm basis on which this science has been built up, in so vivid a way before its readers. We can only rejoice that it has been left to a German to present the result of German experience before the inhabitants of the most distant countries in a clearer manner than has ever been before possible, for the author mentions in the introduction to his sylviculture, only German works on Forestry as being referred to in the preparation of his book In the introduction, the author shows himself to be a student of Political Economy as applied to Forestry; and then follows a chapter on locality in which the atmosphere, climate, the chemical and physical composition of the

soil, the effects of the soil on vegetation and of vegetation on the soil, are thoroughly explained The section closes with a good example of yield Tables. Dr. Schlich is well acquainted with the newest theories on the influence of climate, and on chemistry as applied to agriculture. In the arrangement of species with regard to locality and other peculiarities, Gayer has been closely followed.

Section II treats of shape, height and volume growth and of the age and reproductive power of the various species Section III takes up the question of pure and mixed woods, and here, as might have been expected, preference is given to the latter in restricted areas and where factors of the locality are numerous. The rules for the creation and preservation of mixed forests are most excellent, so also are the diagrams of the mixture of our principal species and it is noteworthy that the objectionable mixture of Scotch Pine and Larch is said to occur frequently and over extensive areas in the United Kindom.

Section IV contains remarks on various sylvicultural systems, arranged as follows:—

Orgin and character of wood.
External dangers.
Quantity and quality of produce.
Effect upon the locality.

And the author expresses himself as in favor of the shelter wood and coppice with standard systems, but does not overlook the disadvantages of these systems. He endeavours rather to present the advantages of each system to his reader; and stress is particularly laid on the fact that final expression of opinion must be withheld in some cases until more experience has been gained.

Finally, Forestry combined with field crops, is mentioned as the system under a variety of forms and names is much employed in India, chiefly in connection with the cultivation of Teak The work ends with a short article on the choice of the systems and and here the preservation and the possible improvement of the factors of locality are considered as most important; financial considerations taking the second place, an arrangement which assuredly no one will gainsay. Whoever wishes to find in Dr. Schlich's Book opinions on the disputed sylvicultural questions of the day, will be disappointed; and indeed, the readers of forest literature are already somewhat tired of these endless disputes. But those who wish to read a workmanlike and comprehensive exposition of the elements of forestry as now accepted to be correct in theory and practice, presented with a remarkable freedom from prejudice and high sounding phraseology, will find great pleasure in persuing this work. It cannot be denied that Dr. Schlich has carried out the object he had in view with excellent success.

IV. TIMBER MARKET, &C.

CHURCHILL AND SIM'S CIRCULAR
of November 6th 1891.

EAST INDIA TEAK.—The deliveries for October have been small, 929 loads only, against 1,574 loads in 1890, and 1,988 loads in 1889. For the first ten months of the year the quantities have been 12,321 loads, against 14,500 loads and 13,240 loads in 1890 and 1889, respectively. Prices, nevertheless, are firm and rising, and with the prospect of reduced supplies and an undiminished demand, the future promises to be in favour of sellers.

EAST INDIA SATINWOOD.—Logs are much wanted.

Price Current.

Indian Teak	...	per load, £8-10s. to £14.
Cedar, Malabar	...	per foot supl. 3½d to 4d.
Satinwood, E. India	...	per ton, £6 to £10.
Ebony, E. India	...	„ „ £10 to £12.

LONDON RATES FOR PRODUCE.

(Tropical Agriculturist of November, 1891.)

Cardamoms, Malabar	...	2s.	to	2s.9d.	lb.
Croton seeds	...	15s.	to	20s.	cwt.
Cutch	...	24s.	to	32s.6d.	„
Gum Arabic, Madras	...	15s.	to	50s.	„
India Rubber, Assam, best	..	1s 6d.	to	1s. 11d.	lb.
Myrabolams, Bombay, best	...	13s.	to	15s.	cwt.
„ (Jubbulpore)	...	12s. 6d.	to	13s 6d.	„
„ (Upper Godavery, best		11s. 6d.	to	12s.6d.	„
Nux Vomica, best	...	11s.	to	13s 6d.	„
Orchella, good	...	20s.	to	25s.	„
Redwood	...	£3	to	£3-10s.	ton.
Sandalwood logs	...	£35	to	£60	„
„ Chips	...	£9	to	£30	„
Sapan wood	...	£4	to	£7	„

V. NOTES, QUERIES AND EXTRACTS.

THE UNITED STATES GOVERNMENT TIMBER TESTS.

The Division of Forestry of the United States Department of Agriculture has commenced a series of examinations and tests of American timber, which far exceeds in magnitude and in scientific thoroughness anything ever before undertaken in this direction According to the *American Architect* there are three departments of the work:—

I.—The Selection of the Timber.

The trees to be examined and tested are first selected by a competent botanist and forester from five or more localities, four large trees of a given species from each place, these sites differing from each other as much as possible in climate and soil conditions These trees are cut up into logs from 6 to 18 ft. in length, with intervening disks 8 in. long A complete record is kept of the botanical names, conditions of growth, time of cutting, age of tree, size, height, &c, and the north and south sides of each log and disc are marked on them, together with the number of tree and of the log. The logs are shipped to St. Louis and discs are sent to Ann Arbor, Mich. Discs are also cut from younger trees and sent to Ann Arbor

II.—The Physical Tests.

The physical tests are carried out at the Washington University Testing Laboratory, St. Louis, under the direction of the writer. The logs are first sawed into appropriate sizes at an ordinary saw-mill. Each log is marked off on its end by a stencil plate in such a way as to obtain a series of 4 in by 4 in. sticks in a north and south zone, and as large a stick alongside as the log will allow, up to 8 in by 16 in. Each stick is marked with a die with the number of the tree, the number of the log in that tree and the number of the stick in the log, the numbers being on the lower end of the log and reading upright when the north side is upward In this way each stick carries a legend, which cannot be effaced, which fully identifies it. A series of stamps,

corresponding to the stencils, is used to show, in the note book, the way in which the log was cut and marked.

After sawing, the sticks are carefully stacked under shelter to await the tests. In the course of, from one to three months after sawing, one end (half) of each 4 in. by 4 in. stick is tested, and also some of the large sticks. The regular tests are as follows :—

1. *The Cross-Bending or Beam Test*.—In this case the load is always put on at the same rate, so as to produce an increase in the deflection of $\frac{1}{2}$ in per minute, and continued uniformly up to rupture. The simultaneous loads and deflections are read off about eight or ten times during the test, the scale beams always being kept balanced and the deflection read off by means of a micrometer screw on the small beams, and from a thread over a paper scale on the large beams. The 4 in. by 4 in. sticks are tested in lengths of 60 in between knife edges, all bearing-surfaces being protected by iron plates The machine used was specially designed for this kind of work and was described in the *Engineering News* of September 14th, 1889.

The large beams are broken on a machine of an original design, consisting of a hydraulic cylinder, plunger, screws, and cross-head, made by Riehlé Brothers, and similar to the parts used in their 100,000 lbs. testing machines. The base or beam part of the machine consists of two long leaf-yellow pine sticks, 6 in by 20 in. by 24 ft long, both being clear, straight, grained wood Between these there is a steel flitch plate $\frac{3}{4}$ in. by 18 in. by 20 ft. long, all bolted together through their neutral axes.

The weighing is done in a standard 100,000 lb. Riehlé machine near by, both being connected up with the same pump, and the weighing machine being blocked. The plungers of the two machines are of the same size, and therefore, except for the difference in the frictional resistances of their plunger packings, they should show the same load for the same unit pressure in the pump. They have the same kind of leather cut packing, and when tested by nests of calibrating springs they show equal loads for equal deflections of springs. These calibrating springs were first tested on the Emery machine at the Watertown Arsenal, and hence both these machines are now standardised with that one. Since this large beam machine will place a load of 100,000 lbs. on a beam 24 ft. long, there has probably never been a wooden beam or a rolled iron or steel beam which could not be broken on this machine if taken in a length from 20 to 24 ft. This is also the only beam machine of large capacity with which the writer is acquainted There are following nuts placed on the power screws, by means of which any given deflection can be held, and in this way time tests can be made on large beams.

From the plotted results, loads and deflections, the modulus of elasticity and the total resistence of the timber up to the point

of maximum loading in inch-pounds per cubic inch of timber are computed in addition to the strength.

2. *The Percentage of Moisture.*—After breaking the beam, it is next bored through 18 in. from each end, and one-third the width of the stick from one side, and the borings used for determining the percentage of moisture Prof. Bauschinger has shown that when the moisture in a stick has fallen below 20 per cent., and especially when below 15 per cent., the strength increases very rapidly as the moisture diminishes.

3. *Specific Gravity and Width of Annual Rings.*—The ends of the broken beam are now cut off, and used for making the other tests named below. One of these is weighed and measured and the specific gravity determined The number of annual rings is also counted in a radial direction across the stick, and the average number per inch is recorded.

4 *Crushing Endwise.*—From each 4 in by 4 in. stick, there is cut a section 8 in. long, and from each large beam there is cut a column 40 in long and 4 in by 4 in in cross-section, and these are tested in compression endwise until the fibres are crushed down and the maximum load passed

5 *Crushing across the Grain.*—From each beam there is taken a section and crushed across the grain on an area 4 in. by 4 in. The maximum load is found to occur when the compression is about 3 per cent. of the height, and hence this amount of distortion is taken as the standard and the compression load found at this limit, which is also considered a reasonable limit in practice

6. *Tensile Tests.*—The tensile strength is found by taking a piece 1 and 1½ in by 2½ in by 15 in long, and cutting it down on circular curves to ⅝ in by 2½ in at the centre, and then pulling it on the 100,000 lbs Riehlé machine. It is held between the ordinary flat wedge-shaped grips It is very difficult to break timber in tension, but after trying various shapes and methods of holding, the above was found most simple and entirely satisfactory

7 *Shearing Test.*—The shearing strength is found by pulling out ends of the slotted holes A piece 2½ in. square is slotted 1 in. from each end, with a hole ¾ in by 1 in. Steel pins are inserted in these and pulled by means of a suitable stirrup The two holes are cut at right angles to each other and both are pulled out, thus getting the shearing strength both ways with reference to the direction of the annual rings. The stick is kept from spreading, or splitting out, by means of head clamps which are put on outside the slotted holes and screwed up to a bearing before the test begins, the initial pressure being only a few pounds.

In all the above tests the direction of the rings is sketched in, and records show also its exact position in the log and in the

tree, so that all known pertinent facts are recorded It is only in this way that the laws governing the strength of timber can be found The reserved sticks will be tested some two years or more later after seasoning, which will be under shelter

There will probably be as many as 2,000 tests made on each of the more important species of timber, and when these are properly collected and discussed it is thought that little will remain undiscovered in regard to the conditions governing the strength of sound timber of all the common varieties. The work has begun with the Southern yellow pines and oaks, six car loads of logs having been received and sawed to date. Since one large stick is cut from each log, and at least two small ones, the relative unit strength of large and small timbers will be determined. The effects of knots, windshakes, seasoning cracks, &c, are also sure to be determined

Tests of Old Timbers.

It is often very desirable to know the strength of old bridge timbers, which, though apparently sound, are more or less cracked along their neutral axes, and have been in service many years If railroad and bridge engineers choose to send in such timbers full size, just as they have been used in the structure, they will be tested promply and at a very small cost. A few tests of this kind would go a long way towards educating the judgment of a chief or of any inspecting engineer who may be charged with the responsibility of deciding when to replace an old structure with a new one.

III.—The Microscopic and Structural Examinations.

The specimen discs sent to Ann Arbor Mich, are examined and studied by competent botanists of the University of Michigan and photographs taken of the structural formation The article is, however, for the information of engineers and architects rather than of botanists, and hence is mostly taken up with a description of the physical tests. This work will run for many years, if sufficiently supported by public opinion, on which all State work really rests If it is continued in the same scale of thoroughness with which it is begun, it is impossible to overestimate its value, both to timber users and to timber growers, for one of the ultimate purposes is to learn the conditions most favourable to the profitable growth of the more valuable kinds of timber Neither are the results of these studies of most immediate use to engineers and architects, but the carriage, waggon, and implement makers, car builders, furniture manufacturers, and the public generally, are equally interested, since it is only the needs of the public which all these are trying to serve.—*Timber Trades Journal 19th September 1891.*

EXPERIMENTS IN FORESTRY.

Although the large quantity of timber still growing on Canadian soil tends to check interest in forest preservation and extension, the Federal Government has recognized the need of such efforts, and has for some years been testing many varieties of tree life at its experimental farms. At the Central Farm, near Ottawa, the seeds of Rocky Mountain and European conifers were liberally sown. This year 175,000 seedlings were transplanted from these beds, to be distributed later on to the branch farms and private experimenters, who will send in careful returns of progress. This year, too, the Government has distributed 100,000 forest-tree seedlings amongs 1,000 applicants in the North-West, with instructions for planting and future treatment. Twenty-five "gardens" along the main line of the Canadian Pacific Railway have also been supplied from the experimental farms. The urgent need of forestry, even in the old provinces, not long ago covered with trees, is illustrated by Mr. J. C Chapais, an authority on such subjects. "I know whole regions," he says, "which were cleared by settlers who had to desert the land soon after because it was worth nothing. Such districts would have been as many inexhaustible wood-reserves for future generations, who, for an almost endless period of time, would find on them all the wood they want. To-day these same districts are quite useless in every respect."—*Times.*

JARRAH WOOD IN CHURCH BUILDING.

The application of foreign woods in English church buildings is essentially an innovation of this latter part of the nineteenth century. In old English ecclesiastical buildings, we naturally look for the timber work, whether constructive or ornamental, to be formed of Oak The wood seems specially adapted for the purpose, and from its association, to have become like the ancient churches themselves, almost hallowed in its use, but we are, apparently, about to change all this, and the latter half of this progressive century will be recorded in future history by the introduction of timber that will probably puzzle the archæologists of future ages On the authority of *The Church Times*, we learn that in the recent, restorations of one of the most interesting of Kentish churches namely that of Herne, situated on the road between Canterbury and Herne Bay, and about 2 miles from the last-named watering place, the bays between the principal and intermediate rafters have been filled in with boarding and finished with mouldings, the spandrels being richly carved ; the whole of the woodwork of the new roof being of Jarrah wood (Eucalyptus marginata) from Western Australia—*Gardener's Chronicle.*

GUTTA PERCHA.

The price of gutta percha has nearly doubled in two years and now rules at $1-30 per pound This remarkab'e advance in the price of the article is attributed to two causes—the large quantities required in the manufacture of electric and other modern devices and the reckless destruction of the trees from which the gum is obtained Gutta is the Malayan term for gum and percha is the name of the tree from which it is obtained ; therefore the name may be translated, gum of the percha tree. This gum or sap is not obtained by merely tapping the trees, as is done by the gatherers of crude rubber along the Amazon and its tributaries ; but the Malays and natives of Borneo, who collect gutta purcha, fell each tree from which gum is to be extracted, and thus the destruction of the trees and consequent scarcity of the product is explained From 1854 to 1875 90,000 piculs, weighing 133⅓ pounds each, of gutta percha, were exported from Sarawak alone, and this meant the death of 3,000,000 trees. As no trees are planted, the only thing that has saved this species of plant from annihilation is that it does not produce the gum in paying quantities until it is twenty-five to thirty years old.

The method pursued in felling the trees is as follows : A staging is erected from fourteen to sixteen feet high, which enables the workmen to cut the trees just above the buttresses or bances as they are called Thetools used in felling are either " bliongs " or " parangs " ; a *bliong* is a kind of axe used by the Malays in felling, building, and the like. The blade is of a chisel-like form and the tang is secured at right angles to a handle by means of a lashing of rattan or cane. The *parang* looks more like a sword bayonet, and in the hands of a Malay is said to be a box of tools in itself, as with it he can cut up his food, fell a tree, build a house or defend himself. After the tree is cut down, some natives beat the bark with mallets to accelerate the flow of the sap, which usually runs slowly, changing color meanwhile It concretes rapidly.

The sap is boiled either with water, lime juice, or cocoanut oil ; and it is generally run into moulds which sometimes produce forms of the hardened material resembling various animals in shape.

The gutta percha tree, the vernacular name of which is *laban*, also bears a fruit about an inch long, ovoid in shape, which is eaten by the natives. In Siak, Sumatra, a vegetable butter is prepared from the seeds of this fruit. The trees attain to a height of from 60 to 80 feet, with a diameter of from 2 to 4 feet. The wood is soft, fibrous, spongy, of a pale color, marked with black lines, these being the reservoirs of the gutta percha. The yield of a well-grown tree of the best variety is from 2 to 3 pounds of gutta percha, such a tree being about 30 years old, 30 to 40 feet high, and 1½ to 3 feet in circumference.

Gutta percha is used in a multitude of different ways. It has been found to be the best non-conductor of electricity and most perfect insulator that has yet been discovered. A wholesale dealer in the article recently stated that scarcely a week passes but some one calls upon him claiming to have found a substitute for gutta percha, but none of the substitutes so far offered has been able to meet the requirements No other substance has been found so efficient for submarine cables; and according to a statement recently published in the New York *Sun*, the Atlantic cable laid in 1857 is still preserved by its gutta percha covering.

This article retains its form at a temperature below 115° F. It is insoluble in water, even in salt water, and it is also insoluble in alkaline solutions and various acids and is, therefore, made into vessels to contain these substances. By mixing bisulphide of carbon with gutta percha, a liquid cement is produced which is employed in putting patches upon shoes, thus dispensing with sewing and securing a neater appearance on the shoe. The same cement is also used in repairing rabbit skins. These skins are weak and are easily torn, but by backing them with this cement they are made tougher, and are also sold in some cases by unscrupulous dealers for squirrel skins. Another use to which gutta percha has been put is placing it round the bottoms of pantaloons to protect them from wear It has been made so thin that a yard of it weighed only 7 to 8 pounds A piece of this was placed around the bottom of the garment, then an inch of cloth was turned in the top of the gutta percha, a hot iron was passed over it, which rendered it secure, thus saving the expense of sewing to the manufacturer.

Since gutta percha has advanced so greatly in price, it has been found impracticable to use it for this and many other purposes, in fact it has been stated that a large engineering firm in the United States proposed to enter upon the manufacture of submarine cables on an extensive scale, but were unable to carry out their purpose, on account of the scarcity and the difficulty of obtaining gutta percha.

Efforts have been made to check the destruction of this most useful tree by substituting tapping for felling, but the greed of the natives is so great that they adhere to the latter method, because it gives them more of the sap for immediate marketing, being regardless of the fact that the trees are being exterminated. The only remedy for the great scarcity of the article seems to be the cultivation of the tree, and measures of this kind will have to be adopted if gutta percha, which seems to be an article entirely indispensable in some lines of manufacture, retains its place in the commerce of the world.—*Indian Agriculturist.*

THE VAMPIRE VINE.

Every one has read Victor Hugo's description of the octopus, which has hitherto been regarded as the most hateful and horrible of all created things. According to *Lucifer*, however, there has been discovered in Nicaragua a plant which is as horrible as the devil fish. This is a vine called by the natives "the devil's snare," which seems literally to drain the blood of any living thing which comes within its death-dealing touch.

Mr. Dunstan, maturalist, who has recently returned from Central America, where he spent nearly two years in the study of the flora and the fauna of the country, relates the finding of a singular growth in one of the swamps which surround the great lakes of Nicaragua. He was engaged in hunting for botanical and entomological specimens, when he heard his dog cry out, as if in agony, from a distance Running to the spot whence the animal's cries came, Mr. Dunstan found him enveloped in a perfect network of what seemed to be a fine rope-like tissue of roots and fibres. The plant or vine seemed composed entirely of bare interlacing stems, resembling, more than anything else, the branches of the weeping willow denuded of its foliage, but of a dark, nearly black hue, and covered with a thick viscid gum that exuded from the pores. Drawing his knife, Mr. Dunstan endeavoured to cut the animal free, but it was only with the greatest difficulty that he succeeded in severing the fleshy muscular fibres. To his horror and amazement the naturalist then saw that the dog's body was blood-stained, while the skin appeared to have been actually sucked or puckered in spots, and the animal staggered as if from exhaustion. In cutting the vine the twigs curled like living, sinuous fingers about Mr. Dunstan's hand, and it required no slight force to free the member from its clinging grasp, which left the flesh red and blistered. The gum exuding from the vine was of a greyish-dark tinge remarkably adhesive, and of a disagreeable animal odour, powerful and nauseating to inhale. The native servants who accompanied Mr. Dunstan manifested the greatest horror of the vine, which they call "the devil's snare," and were full of stories of its death-dealing powers. He was able to discover very little about the nature of the plant, owing to the difficulty of handling it, for its grasp can only be torn away with the loss of skin and even of flesh; but, as near as Mr. Dunstan could ascertain, its power of suction is contained in a number of infinitesimal mouths or little suckers, which, ordinarily closed, open for the reception of food If the substance is animal, the blood is drawn off and the carcass or refuse then dropped. A lump of raw meat being thrown it, in the short space of five minutes the blood will be thoroughly drunk off and the mass thrown aside. Its voracity is almost beyond belief.

VI.—EXTRACTS FROM OFFICIAL GAZETTES.

1.—Gazette of India.—

17*th November*, 1891.—*No.* 350-*D. Ent.*—Mr. E. C. Cotes, First Assistant to the Superintendent of the Indian Museum, returned from the deputation to the Dehra Dun Forest School, sanctioned in the Government of India, Revenue and Agricultural Department, Notification No 1972-6 M. and Ex., dated 23rd September, 1891, and resumed his duties on the forenoon of the 3rd November, 1891.

2.—Madras Gazette.—

6*th November*, 1891.—*No.* 501.—Mr. C. Somers Smith, Assistant Conservator of Forests, Madras, has been granted by the Right Honorable the Secretary of State for India an extension of six months' extra, ordinary leave on medical certificate, without pay, in continuation of the leave notified at page 929, Part I, of the *Fort St. George Gazette* dated 15th September 1891.

2*nd November*, 1891.—*No* 416.—In exercise of the power conferred upon him by clauses (3) and (8) of paragraph 1 of the notification of the Government of India in the Home Deprtment, No. 518, dated the 6th March 1879, as amended by the Notifications of the same Government, Nos. 2343 and 996, dated the 2nd December 1890, and the 4th June 1891, and in supersession of the notification of this Government issued under G O, dated 20th August 1891, No. 1649 Judicial, the Right Honorable the Governor in Council is pleased to exempt the following classes of persons from the operation of all prohibitions and directions contained in sections 13 to 16 of the Indian Arms Act, 1878, other than those relating to cannon, articles designed for torpedo service, war-rockets and machinery for the manufacture of arms and ammunition :—

(4) *Forest Department.*—All Gazetted officers of the Forest Department, Forest Rangers and Foresters.

14*th November.*—*No* 504.—Mr. E. P. Popert, Conservator of Forests, Burma, to act as Conservator of Forests, First Grade, and to be in charge of the Central Circle, with head-quarters at Madras.

No. 505.—Mr. J. W. Cherry, Deputy Conservator of Forests, First Grade, to act as Conservator of Forests, Second Grade, and to be in charge of the Southern Circle, with head quarters at Coimbatore

No 506.—Mr. E. D. M. Hooper, Deputy Conservator of Forests, Second Grade, to act as Conservator of Forests, Third Grade, and to be in charge of the Northern Circle, with head-quarters at Bezvada.

21*st November.*—*No.* 514.—Mr. C. Du Pré Thornton, Assistant Conservator of Forests, is granted examination leave for two months, from or after 19th November 1891.

30*th November.*—*No* 522—Mr. A. W. Lushington, Deputy Conservator of Forests, Madras, has been granted by the Right Honorable the Secretary of State for India an extension of six months' leave on medical certificate, in continuation of the leave notified at page 120, Part I, of the *Fort St. George, Gazette,* dated 24th February 1891.

3.—Bombay Gazette.—

4th November.—*No.* 5783.—Mr. L. S. Osmaston, Sub-Divisional Forest Officer, South Thana passed on the 15th ultimo the examination prescribed in Rule 6 of the Rules published in Government Notification No. 2878 dated 4th June 1880, for the examination of Forest Officers.

2. Mr. Osmaston passed the examination in subject No. 1 in Maráthi.

4th November, 1891.—Messrs. G. A. Hight and R. P. Ryan respectively delivered over and received charge of the Divisional Forest Office, Bijápur, on the afternoon of the 29th ultimo.

6th November, 1891 —*No.* 7624.—His Excellency the Governor in Council in pleased to appoint—

(1) Mr. L. S. Osmaston to be Divisional Forest Officer, North Thána.

(2) Mr. E. G. Oliver, on return from leave, to do duty as Divisional Forest Officer, West Khándesh.

16th November, 1891.—*No.* 6983.—Mr. R P. Ryan, Assistant Conservator of Forests First Grade, and Divisional Forest Officer, Bijápur, has been granted an extension by five days of the privilege leave for twenty days allowed to him by Government Notification No. 3367 dated 26th September 1891.

19th November, 1891.—Messrs. W. A. Wallinger and H. W. Keys respectively delivered over and received charge of the Panch Máhals Division Forest Office on the 11th instant, in the afternoon.

Mr. J. H. Clabby, Sub-Division Forest Officer, South Thána, reported himself for duty as Assistant Demarcation Officer, Thána District, to the Forest Settlement Officer, Thána, in the forenoon on the 10th instant, as per Government Resolution No. 7049, dated 14th October 1891, in the Revenue Department.

23rd November.—Messrs. F. R. Desai, Deputy Conservator of Forests, First Grade, and E. G. Oliver, Assistant Conservator of Forests, respectively delivered over and received charge of the Divisional Forest Office, West Khándesh, on the 13th instant, after office hours.

24th November, 1891.—Messrs. J. H. Clabby, North Sub-Division Forest Officer, and L. S. Osmaston, South Sub-Division Forest Officer, South Thána, respectively delivered over and received charge of the North Sub-Division Forest Office, South Thána, on the 9th instant, after office hours, Mr. Osmaston holding charge of the North Sub-Division Office in addition to his own.

28th November.—Messrs. L. S. Osmaston, Assistant Conservator of Forests, and G. P. Millett, Deputy Conservator of Forests, respectively delivered over and received charge of the North and South Sub-Division Forest Offices, South Thána Division, on the 18th instant, after office hours.

Messrs. G. P. Millett, Deputy Conservator of Forests, and L. S. Osmaston, Assistant Conservator of Forests, respectively delivered over and received charge of the Divisional Forest Office, North Thána, on the 18th instant, after office hours.

27th November, 1891 —*No.* 8138.—His Excellency the Governor in Council is pleased to appoint Mr. Ardesir Nasarvánji Master, L.C.E., to act as Sub-Assistant Conservator of Forests, Third Grade.

4.—BENGAL GAZETTE.—

24th November, 1891.—*No* 3508.—In continuation of the orders contained in the Notification of this Department, dated the 31st May, 1891, published at page 555, Part I of the *Calcutta Gazette* of the 3rd June, 1891, a further extension of sick leave on medical certificate for three months, under articles 266 and 369 of the Civil Service Regulations, is granted to Babu Shama Charan Chuckerbutty, Sub Assistant Conservator of Forests

30th November, 1891.—*No* 3589.—Under the authority contained in the circular of the Government of India, Revenue and Agricultural Department, No. 18F., dated the 29th July, 1891, the Lieutenant-Governor is pleased to order the following changes in the Lower Controlling Staff of the *Bengal Forest Service*, with effect from the 26th February, 1891:—

Mr. R Quinnell, Sub-Assistant Conservator of Forests, to be an Extra-Assistant Conservator of Forests, first grade.

Babu Sree Dhur Chuckerbutty, Sub Assistant Conservator of Forests, to be an Extra Assistant Conservator of Forests, second grade.

Mr J. C Mendes, Sub-Assistant Conservator of Forests, to be an Extra Assistant Conservator of Forests, third grade.

Mr. E J N. James, Sub-Assistant Conservator of Forests, to be an Extra-Assistant Conservator of Forests, third grade.

Babu Shama Charan Chuckerbutty, Sub Assistant Conservator of Forests, to be an Extra-Assistant Conservator of Forests, fourth grade.

Mr E E Slane, Sub-Assistant Conservator of Forests, to be an Extra Assistant Conservator of Forests, fourth grade.

Babu Kedar Nath Mozumdar, Officiating Sub-Assistant Conservator of Forests, to officiate as an Extra-Assistant Conservator of Forests, fourth grade, with effect from the 13th April, 1891, *vice* Babu Shama Charan Chuckerbutty on leave, or until further orders.

1st December, 1891.—*No.* 3067.—Mr. H. D D French, Officiating Deputy Conservator of Forests, on return from the leave granted to him in the Notification of this Department, dated the 27th July, 1891, is posted to the charge of the Teesta Forest Division.

Mr French assumed charge of the Teesta Division on the forenoon of the 26th October, 1891.

5.—NORTH-WEST PROVINCES AND OUDH GAZETTE.—

16th November, 1891.—*No.* 5673.—Mr. J. M. Blanchfield, Extra Assistant Conservator of Forests, in charge of the Bundelkhand Forests Division of the Central Circle, on being relieved by Babu Raghunath Pathak, to the charge of the Kamaun Division of that circle.

No. 5677.—Babu Raghunath Pathak, Extra Assistant Conservator of Forests, in charge of the Gorakhpur Forest Division of the Oudh Circle, on being relieved by Mr M. Hill, to the charge of the Bundelkhand Division of the Central Circle.

21st November, 1891.—*No.* 5779.—With effect from the 7th November 1891, Mr A G. Hobart-Hampden, Deputy Conservator of Forests, Kumaun Division, to the charge of the Naini Tal Forest

Division and the Direction Office of the Central Circle, but to continue to hold charge of the Kumaun Forest Division, in addition to his own duties, until relieved by Mr. J. M. Blanchfield.

6.—PUNJAB GAZETTE.—

25th November, 1891.—*No.* 417 —Mr. E. A. Down, Deputy Conservator of Forests, Umballa Forest Division, has obtained privilege leave of absence for one month, under Article 277 of the Civil Service Regulations, with effect from the 26th of November 1891, or such subsequent date as he may be relieved.

2nd December, 1891.—*No.* 427 —In continuation of Punjab Government Notification No. 384, dated the 30th of October 1891, the following further reversion shall have effect from the 29th July 1891 :—

Mr. J. L. Pigot, Officiating Deputy Conservator of Forests, 3rd Grade, to be Deputy Conservator of Forests, 4th Grade, sub *pro tem.*

8.—BURMA GAZETTE.—

30th October 1891.—*No.* 257.—On being relieved by Mr. R. F. Lowis, Mr. E. A. O'Bryen, Assistant Conservator of Forests, is transferred from Pyinmana to the Bhamo Forest division.

No. 258.—On his return from examination leave, Mr. R. F. Lowis, Sub-ASSISTANT Conservator of Forests, is posted to the Pyinmana Forest division.

6th November 1891.—*No.* 236.—At the departmental examinations held at Rangoon on the 2nd and 3rd November 1891 the following officers passed the examination in the Burmese language by the Standards specified below—

Higher Standard.

Mr. E. A. O'Bryen, Assistant Conservator of Forests.
Mr. H. Carter, Assistant Conservator of Forests.
Mr. W. F. L. Tottenham, Assistant Conservator of Forests.

Lower Standard.

Mr. G. R. Long, Assistant Conservator of Forests.

5th November 1891,—*No*, 5.—Mr. M. H. Ferrars, Deputy Conservator of Forests, made over, and Mr. W. T. T. McHarg, Assistant Conservator of Forests, received charge of, the Agency division, on the afternoon of the 4th November 1891.

17th November 1891.—No. 266.—In accordance with the orders contained in Forest Department Circular No. 18F., dated the 29th July 1891, the Chief Commissioner directs that, with effect from the 1st December 1891, the officers of the lower controlling staff of the Forest Department in Upper and Lower Burma (now styled Sub-Assistant Conservators) shall be graded in the following grades and in the following order. Their appellation will in future be Extra Assistant Conservators :—

EXTRA ASSISTANT CONSERVATORS.—FIFTEEN.

First grade.—Three.

1. Mr. Charles Ingram. | 2. Vacant.
3. Vacant.

Second grade.—Two.

2. Mr. E. M. Buchanan. | 2 Vacant.

Third grade.—Six.

1. Maung Kale | 4. } Vacant.
2. Mr. C. W. Allen. | 5. }
3. Mr. D. L. K. Calderwood. | 6. }

Fourth grade.—Four (temporarily six).

1. Mr. W.J. Lane-Ryan. } *on pro-*
2. Mr. E. P. Powell. } *bation.*
3. Mr. W. A. Hearsey. }

4. Mr. R. F. Lowis,—*on probation.*
5. Maung Shwe Ka.
6. Maung We

20th November, 1891.—*No.* 251.—At the departmental examinations held at Mônywa, Bhamo, Mogôk, and Thayetmyo on the 2nd and 3rd November 1891 the following officer passed the examination in Burmese by the standards specified below :—

Lower Standard.

Mr. H. H. Forteath, Assistant Conservator of Forests.

25th November 1891.—*No.* 272.—Mr. J. Messer, Assistant Conservator of Forests, is posted to the Working Plans Division and is specially appointed to be a Working Plans Officer in that Division.

No. 273.—The following transfers are ordered :—

Mr. J. Nisbet, Deputy Conservator of Forests, from Mandalay to the charge of the Rangoon Forest division.

Mr. W. F. L. Tottenham, Assistant Conservator of Forests, from Rangoon to the Tharrawaddy Forest division.

9.—ASSAM GAZETTE.—

25th November, 1891.—*No.* 9874*G*,—With effect from the 16th November 1891, in consequence of the return of Mr. T. J. Campbell, Assistant Conservator of Forests, First Grade, from furlough,—

Mr. T. J. Campbell to officiate as Deputy Conservator, Fourth Grade.

Mr. G. H. Young to revert to his substantative appointment as Assistant Conservator, First Grade.

Mr. W. F. Lloyd to revert to his substantative appointment as Assistant Conservator, Second Grade.

28th November. Privilege leave of absence for six weeks, under Art 291 of the Civil Service Regulations, is granted to Mr. J. T. Jellicoe, Deputy Conservator, Darrang Forest Division, from 20th November 1891 or the subsequent date on which he may avail himself of it.

10.—HYDERABAD RESIDENCY GAZETTE.

3rd November, 1891.—*No.* 284.—In consequence of the transfer of Mr. G. F. Taylor, Deputy Conservator of Forests, to the Central Provinces, Mr. C. Haldane, District Forest Officer, Akola, is placed in charge of the Basim District in addition to his own district, as a special and temporary arrangement.

Mr. Taylor made over and Mr. Haldane received charge of the Basim District on the forenoon of the 18th August 1891.

11.—MYSORE STATE GAZETTE.—

10th November 1891.—*No.* 309.—Mr. Narayanaiengar, Offg. Assistant Comissioner, delivered over, and Mr. Ramaswami Iyer, Officiating Assistant Conservator of Forests, assumed, charge of the Kadur District Forest Office, on the afternoon of the 7th October 1891.

No. 310.—Mr. Ramaswami Iyer, Officiating Assistant Conservator of Forests, delivered over, and Mr Sitaramaiya, Assistant Conservator of Forests, assumed charge of the Mysore District Forest Office, on the afternoon of the 14th September 1891.